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<110> Schmulling, Thomas
Werner, Tomas

<120> Method for modifying plant morphology, biochemistry and physiology

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<141> 2001-12-10

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<151> 2001-06-16

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Asn Leu Lys Ser Lys Gly Gln Trp Asp Val Pro His Pro Trp Leu Asn
    370                 375                 380

Leu Phe Val Pro Lys Thr Gln Ile Ser Lys Phe Asp Asp Gly Val Phe
385                 390                 395                 400

Lys Gly Ile Ile Leu Arg Asn Asn Ile Thr Ser Gly Pro Val Leu Val
                405                 410                 415

Tyr Pro Met Asn Arg Asn Lys Trp Asn Asp Arg Met Ser Ala Ala Ile
            420                 425                 430

Pro Glu Glu Asp Val Phe Tyr Ala Val Gly Phe Leu Arg Ser Ala Gly
        435                 440                 445

Phe Asp Asn Trp Glu Ala Phe Asp Gln Glu Asn Met Glu Ile Leu Lys
    450                 455                 460

Phe Cys Glu Asp Ala Asn Met Gly Val Ile Gln Tyr Leu Pro Tyr His
465                 470                 475                 480

Ser Ser Gln Glu Gly Trp Val Arg His Phe Gly Pro Arg Trp Asn Ile
                485                 490                 495

Phe Val Glu Arg Lys Tyr Lys Tyr Asp Pro Lys Met Ile Leu Ser Pro
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Gly Gln Asn Ile Phe Gln Lys Ile Asn Ser Ser
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515 520

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aacgttcatg agcttgacgt tattaccggt acgtaaatac caaaacttca ctaatctcgt 660

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gaaacagtat ctatgatctt ctagatgctc tttttttgtc tgcaagcttt aattgtagta 780

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Phe Leu Pro Ile Ser Leu Asn Leu Thr Val Leu Thr Asp Pro Phe Ser
35 40 45

Ile Ser Ala Ala Ser His Asp Phe Gly Asn Ile Thr Asp Glu Asn Pro
50 55 60

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Gly Ala Val Leu Cys Pro Ser Ser Thr Thr Glu Val Ala Arg Leu Leu
 65                  70                  75                  80

Arg Phe Ala Asn Gly Gly Phe Ser Tyr Asn Lys Gly Ser Thr Ser Pro
                85                  90                  95

Ala Ser Thr Phe Lys Val Ala Ala Arg Gly Gln Gly His Ser Leu Arg
            100                 105                 110

Gly Gln Ala Ser Ala Pro Gly Gly Val Val Val Asn Met Thr Cys Leu
        115                 120                 125

Ala Met Ala Ala Lys Pro Ala Ala Val Val Ile Ser Ala Asp Gly Thr
    130                 135                 140

Tyr Ala Asp Val Ala Ala Gly Thr Met Trp Val Asp Val Leu Lys Ala
145                 150                 155                 160

Ala Val Asp Arg Gly Val Ser Pro Val Thr Trp Thr Asp Tyr Leu Tyr
                165                 170                 175

Leu Ser Val Gly Gly Thr Leu Ser Asn Ala Gly Ile Gly Gly Gln Thr
            180                 185                 190

Phe Arg His Gly Pro Gln Ile Ser Asn Val His Glu Leu Asp Val Ile
        195                 200                 205

Thr Gly Lys Gly Glu Met Met Thr Cys Ser Pro Lys Leu Asn Pro Glu
    210                 215                 220

Leu Phe Tyr Gly Val Leu Gly Gly Leu Gly Gln Phe Gly Ile Ile Thr
225                 230                 235                 240

Arg Ala Arg Ile Ala Leu Asp His Ala Pro Thr Arg Val Lys Trp Ser
                245                 250                 255

Arg Ile Leu Tyr Ser Asp Phe Ser Ala Phe Lys Arg Asp Gln Glu Arg
            260                 265                 270

Leu Ile Ser Met Thr Asn Asp Leu Gly Val Asp Phe Leu Glu Gly Gln
        275                 280                 285

Leu Met Met Ser Asn Gly Phe Val Asp Thr Ser Phe Phe Pro Leu Ser
    290                 295                 300

Asp Gln Thr Arg Val Ala Ser Leu Val Asn Asp His Arg Ile Ile Tyr
305                 310                 315                 320

Val Leu Glu Val Ala Lys Tyr Tyr Asp Arg Thr Thr Leu Pro Ile Ile
                325                 330                 335

Asp Gln Val Ile Asp Thr Leu Ser Arg Thr Leu Gly Phe Ala Pro Gly
            340                 345                 350

Phe Met Phe Val Gln Asp Val Pro Tyr Phe Asp Phe Leu Asn Arg Val
        355                 360                 365

Arg Asn Glu Glu Asp Lys Leu Arg Ser Leu Gly Leu Trp Glu Val Pro
    370                 375                 380
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His Pro Trp Leu Asn Ile Phe Val Pro Gly Ser Arg Ile Gln Asp Phe
385                 390                 395                 400

His Asp Gly Val Ile Asn Gly Leu Leu Leu Asn Gln Thr Ser Thr Ser
                405                 410                 415

Gly Val Thr Leu Phe Tyr Pro Thr Asn Arg Asn Lys Trp Asn Asn Arg
            420                 425                 430

Met Ser Thr Met Thr Pro Asp Glu Asp Val Phe Tyr Val Ile Gly Leu
        435                 440                 445

Leu Gln Ser Ala Gly Gly Ser Gln Asn Trp Gln Glu Leu Glu Asn Leu
    450                 455                 460

Asn Asp Lys Val Ile Gln Phe Cys Glu Asn Ser Gly Ile Lys Ile Lys
465                 470                 475                 480

Glu Tyr Leu Met His Tyr Thr Arg Lys Glu Asp Trp Val Lys His Phe
                485                 490                 495

Gly Pro Lys Trp Asp Asp Phe Leu Arg Lys Lys Ile Met Phe Asp Pro
            500                 505                 510

Lys Arg Leu Leu Ser Pro Gly Gln Asp Ile Phe Asn
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Ala Ile Asp Val Asp Gly His Phe Thr Val His Pro Ser Asp Leu Ala
         35                  40                  45

Ser Val Ser Ser Asp Phe Gly Met Leu Lys Ser Pro Glu Glu Pro Leu
     50                  55                  60

Ala Val Leu His Pro Ser Ser Ala Glu Asp Val Ala Arg Leu Val Arg
 65                  70                  75                  80

Thr Ala Tyr Gly Ser Ala Thr Ala Phe Pro Val Ser Ala Arg Gly His
                 85                  90                  95

Gly His Ser Ile Asn Gly Gln Ala Ala Ala Gly Arg Asn Gly Val Val
            100                 105                 110

Val Glu Met Asn His Gly Val Thr Gly Thr Pro Lys Pro Leu Val Arg
        115                 120                 125

Pro Asp Glu Met Tyr Val Asp Val Trp Gly Gly Glu Leu Trp Val Asp
    130                 135                 140

Val Leu Lys Lys Thr Leu Glu His Gly Leu Ala Pro Lys Ser Trp Thr
145                 150                 155                 160

Asp Tyr Leu Tyr Leu Thr Val Gly Gly Thr Leu Ser Asn Ala Gly Ile
                165                 170                 175

Ser Gly Gln Ala Phe His His Gly Pro Gln Ile Ser Asn Val Leu Glu
            180                 185                 190

Leu Asp Val Val Thr Gly Lys Gly Glu Val Met Arg Cys Ser Glu Glu
        195                 200                 205

Glu Asn Thr Arg Leu Phe His Gly Val Leu Gly Gly Leu Gly Gln Phe
    210                 215                 220

Gly Ile Ile Thr Arg Ala Arg Ile Ser Leu Glu Pro Ala Pro Gln Arg
225                 230                 235                 240
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Val Arg Trp Ile Arg Val Leu Tyr Ser Ser Phe Lys Val Phe Thr Glu
                245                 250                 255

Asp Gln Glu Tyr Leu Ile Ser Met His Gly Gln Leu Lys Phe Asp Tyr
            260                 265                 270

Val Glu Gly Phe Val Ile Val Asp Glu Gly Leu Val Asn Asn Trp Arg
        275                 280                 285

Ser Ser Phe Phe Ser Pro Arg Asn Pro Val Lys Ile Ser Ser Val Ser
    290                 295                 300

Ser Asn Gly Ser Val Leu Tyr Cys Leu Glu Ile Thr Lys Asn Tyr His
305                 310                 315                 320

Asp Ser Asp Ser Glu Ile Val Asp Gln Glu Val Glu Ile Leu Met Lys
                325                 330                 335

Lys Leu Asn Phe Ile Pro Thr Ser Val Phe Thr Thr Asp Leu Gln Tyr
            340                 345                 350

Val Asp Phe Leu Asp Arg Val His Lys Ala Glu Leu Lys Leu Arg Ser
        355                 360                 365

Lys Asn Leu Trp Glu Val Pro His Pro Trp Leu Asn Leu Phe Val Pro
    370                 375                 380

Lys Ser Arg Ile Ser Asp Phe Asp Lys Gly Val Phe Lys Gly Ile Leu
385                 390                 395                 400

Gly Asn Lys Thr Ser Gly Pro Ile Leu Ile Tyr Pro Met Asn Lys Asp
                405                 410                 415

Lys Trp Asp Glu Arg Ser Ser Ala Val Thr Pro Asp Glu Glu Val Phe
            420                 425                 430

Tyr Leu Val Ala Leu Leu Arg Ser Ala Leu Thr Asp Gly Glu Glu Thr
        435                 440                 445

Gln Lys Leu Glu Tyr Leu Lys Asp Gln Asn Arg Arg Ile Leu Glu Phe
    450                 455                 460

Cys Glu Gln Ala Lys Ile Asn Val Lys Gln Tyr Leu Pro His His Ala
465                 470                 475                 480

Thr Gln Glu Glu Trp Val Ala His Phe Gly Asp Lys Trp Asp Arg Phe
                485                 490                 495

Arg Ser Leu Lys Ala Glu Phe Asp Pro Arg His Ile Leu Ala Thr Gly
            500                 505                 510

Gln Arg Ile Phe Gln Asn Pro Ser Leu Ser Leu Phe Pro Pro Ser Ser
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Ser Ser Ser Ser Ala Ala Ser Trp
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<213> Arabidopsis thaliana

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catggaccac agatcagcaa tgttcatcaa ctggagattg tcacaggtta gttcagagtt 600

gcagtattcg tgttttgaaa gcatagactc tatatggttg gtgactatta acaacatgaa 660

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Phe Lys Leu Ala Cys Cys Phe Ser Ser Ser Ile Ser Ser Leu Lys Ala
             20                  25                  30

Leu Pro Leu Val Gly His Leu Glu Phe Glu His Val His His Ala Ser
         35                  40                  45

Lys Asp Phe Gly Asn Arg Tyr Gln Leu Ile Pro Leu Ala Val Leu His
     50                  55                  60

Pro Lys Ser Val Ser Asp Ile Ala Ser Thr Ile Arg His Ile Trp Met
 65                  70                  75                  80

Met Gly Thr His Ser Gln Leu Thr Val Ala Ala Arg Gly Arg Gly His
                 85                  90                  95

Ser Leu Gln Gly Gln Ala Gln Thr Arg His Gly Ile Val Ile His Met
            100                 105                 110

Glu Ser Leu His Pro Gln Lys Leu Gln Val Tyr Ser Val Asp Ser Pro
        115                 120                 125

Ala Pro Tyr Val Asp Val Ser Gly Gly Glu Leu Trp Ile Asn Ile Leu
    130                 135                 140

His Glu Thr Leu Lys Tyr Gly Leu Ala Pro Lys Ser Trp Thr Asp Tyr
145                 150                 155                 160

Leu His Leu Thr Val Gly Gly Thr Leu Ser Asn Ala Gly Ile Ser Gly
                165                 170                 175

Gln Ala Phe Arg His Gly Pro Gln Ile Ser Asn Val His Gln Leu Glu
            180                 185                 190

Ile Val Thr Gly Lys Gly Glu Ile Leu Asn Cys Thr Lys Arg Gln Asn
        195                 200                 205

Ser Asp Leu Phe Asn Gly Val Leu Gly Gly Leu Gly Gln Phe Gly Ile
    210                 215                 220

Ile Thr Arg Ala Arg Ile Ala Leu Glu Pro Ala Pro Thr Met Asp Gln
225                 230                 235                 240
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Glu Gln Leu Ile Ser Ala Gln Gly His Lys Phe Asp Tyr Ile Glu Gly
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Phe Val Ile Ile Asn Arg Thr Gly Leu Leu Asn Ser Trp Arg Leu Ser
            260                 265                 270

Phe Thr Ala Glu Glu Pro Leu Glu Ala Ser Gln Phe Lys Phe Asp Gly
        275                 280                 285

Arg Thr Leu Tyr Cys Leu Glu Leu Ala Lys Tyr Leu Lys Gln Asp Asn
    290                 295                 300

Lys Asp Val Ile Asn Gln Glu Val Lys Glu Thr Leu Ser Glu Leu Ser
305                 310                 315                 320

Tyr Val Thr Ser Thr Leu Phe Thr Thr Glu Val Ala Tyr Glu Ala Phe
                325                 330                 335

Leu Asp Arg Val His Val Ser Glu Val Lys Leu Arg Ser Lys Gly Gln
            340                 345                 350

Trp Glu Val Pro His Pro Trp Leu Asn Leu Leu Val Pro Arg Ser Lys
        355                 360                 365

Ile Asn Glu Phe Ala Arg Gly Val Phe Gly Asn Ile Leu Thr Asp Thr
    370                 375                 380

Ser Asn Gly Pro Val Ile Val Tyr Pro Val Asn Lys Ser Lys Trp Asp
385                 390                 395                 400

Asn Gln Thr Ser Ala Val Thr Pro Glu Glu Glu Val Phe Tyr Leu Val
                405                 410                 415

Ala Ile Leu Thr Ser Ala Ser Pro Gly Ser Ala Gly Lys Asp Gly Val
            420                 425                 430

Glu Glu Ile Leu Arg Arg Asn Arg Arg Ile Leu Glu Phe Ser Glu Glu
        435                 440                 445

Ala Gly Ile Gly Leu Lys Gln Tyr Leu Pro His Tyr Thr Thr Arg Glu
    450                 455                 460

Glu Trp Arg Ser His Phe Gly Asp Lys Trp Gly Glu Phe Val Arg Arg
465                 470                 475                 480

Lys Ser Arg Tyr Asp Pro Leu Ala Ile Leu Ala Pro Gly His Arg Ile
                485                 490                 495

Phe Gln Lys Ala Val Ser Tyr Ser
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: primer or probe

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: primer or probe

<400> 14

gcgtcgactt atacagttct aggtttcggc agtat 35

<210> 15
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

<400> 15

gcggtaccag agagagaaac ataaacaaat ggc 33

<210> 16
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<220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

<400> 16

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<210> 17
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

<400> 17

gcggtacctt cattgataag aatcaagcta ttca 34

<210> 18
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

<400> 18

gcggtaccca aagtggtgag aacgactaac a 31

<210> 19
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

<400> 19

gcggtacccc cattaaccta cccgtttg 28

<210> 20
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

<400> 20

gcggtaccag acgatgaacg tacttgtctg ta 32

<210> 21
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

<400> 21

ggggtacctt gatgaatcgt gaaatgac 28

<210> 22
<211> 31
<212> DNA

<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

<400> 22

ggggtaccct ttcctcttgg ttttgtcctg t 31

<210> 23
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

<400> 23

gctctagatc aggaaaagaa ccatgcttat ag 32

<210> 24
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

<400> 24

gctctagatc atgagtatga gactgccttt tg 32

<210> 25
<211> 1728
<212> DNA
<213> Arabidopsis thaliana

<400> 25

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gttagtaccc caaaagaatt accttcttca aatccttcag atattcgttc ctcattagtt 180

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ggcaacagat accagttacc acctttggca attctacatc caaggtcagt ttttgatatt 300

tcatcgatga tgaagcatat agtacatctg ggctccacct caaatcttac agtagcagct 360

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atggagtcac ttcgaagtcc tgatatcagg atttataagg ggaagcaacc atatgttgat 480

gtctcaggtg gtgaaatatg gataaacatt ctacgcgaga ctctaaaata cggtctttca 540

ccaaagtcct ggacagacta ccttcatttg accgttggag gtacactatc taatgctgga 600

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gttacaggga aaggagaagt cgtaacctgt tctgagaagc ggaattctga acttttcttc 720

agtgttcttg gcgggcttgg acagtttggc ataatcaccc gggcacggat ctctcttgaa 780

ccagcaccgc atatggttaa atggatcagg gtactctact ctgacttttc tgcattttca 840

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aaccaaagag ttatgaactt ctgcgcagca gcaaacctca acgtgaagca gtatttgccc 1500

cattatgaaa ctcaaaaaga gtggaaatca cactttggca aaagatggga aacatttgca 1560

cagaggaaac aagcctacga ccctctagcg attctagcac ctggccaaag aatattccaa 1620

aagacaacag gaaaattatc tcccatccaa ctcgcaaagt caaaggcaac aggaagtcct 1680

caaaggtacc attacgcatc aatactgccg aaacctagaa ctgtataa 1728

<210> 26
<211> 1506
<212> DNA
<213> Arabidopsis thaliana

<400> 26

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aacggtatta aaattgattt acctaaatcc cttaacctca ccctctctac cgatccttcc 120

atcatctccg cagcctctca tgacttcgga aacataacca ccgtgacccc cggcggcgta 180

atctgcccct cctccaccgc tgatatctct cgtctcctcc aatacgccgc aaacggaaaa 240

agtacattcc aagtagcggc tcgtggccaa ggccactcct taaacggcca agcctcggtc 300

tccggcggag taatcgtcaa catgacgtgt atcactgacg tggtggtttc aaaagacaag 360

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gaattgttct atggagtgtt aggaggtttg ggtcaatttg gaattataac gagagccaga 660

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acaactttta caaaggacca agaacgtttg atatcaatgg caaacgatat tggagtcgac 780

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gtagccaagt attatgatga tcccaatctc cccatcatca gcaaggttat tgacacatta 960

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gttatatata ttatcggact actacaatcc gctaccccaa aggatcttcc agaagtggag 1320

agcgttaacg agaagataat taggttttgc aaggattcag gtattaagat taagcaatat 1380

ctaatgcatt atactagtaa agaagattgg attgagcatt ttggatcaaa atgggatgat 1440

ttttcgaaga ggaaagatct atttgatccc aagaaactgt tatctccagg gcaagacatc 1500

ttttga 1506

<210> 27
<211> 1572
<212> DNA
<213> Arabidopsis thaliana

<400> 27

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attactctct caactccgat cacaaccaac acatcaccac aaccatggaa tatcctttca 120

cacaacgaat tcgccggaaa actcacctcc tcctcctcct ccgtcgaatc agccgccaca 180

gatttcggcc acgtcaccaa aatcttccct tccgccgtct taatcccttc ctccgttgaa 240

gacatcacag atctcataaa actctctttt gactctcaac tgtcttttcc tttagccgct 300

cgtggtcacg gacacagcca ccgtggccaa gcctcggcta aagacggagt tgtggtcaac 360

atgcggtcca tggtaaaccg ggatcgaggt atcaaggtgt ctaggacctg tttatatgtt 420

gacgtggacg ctgcgtggct atggattgag gtgttgaata aaactttgga gttagggtta 480

acgccggttt cttggacgga ttatttgtat ttaacagtcg gtgggacgtt atcaaacggc 540

ggaattagtg gacaaacgtt tcggtacggt ccacagatca ctaatgttct agagatggat 600

gttattactg gaaaaggaga gattgcaact tgttccaagg acatgaactc ggatcttttc 660

ttcgcggtgt taggaggttt gggtcaattc ggcattataa caagagccag aattaaactt 720

gaagtagctc cgaaaagggc caagtggtta aggtttctat acatagattt ctccgaattc 780

acaagagatc aagaacgagt gatatcgaaa acggacggtg tagatttctt agaaggttcc 840

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cacttgagga tcgcctcaat ggtcaaacga catcgtgtca tctactgcct tgaagtcgtc 960

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aaccgagttc gaaccggaga gctaaacctg aaatccaaag gccaatggga tgttccacat 1140

ccatggctta atctcttcgt accaaaaact caaatctcca aatttgatga tggtgttttt 1200

aagggtatta tcctaagaaa taacatcact agcggtcctg ttcttgttta tcctatgaat 1260

cgcaacaagt ggaatgatcg gatgtctgcc gctatacccg aggaagatgt attttatgcg 1320

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gaaatactga agttttgtga ggatgctaat atgggggtta tacaatatct tccttatcat 1440

tcatcacaag aaggatgggt tagacatttt ggtccgaggt ggaatatttt cgtagagaga 1500

aaatataaat atgatcccaa aatgatatta tcaccgggac aaaatatatt tcaaaaaata 1560

aactcgagtt ag 1572

<210> 28
<211> 1575
<212> DNA
<213> Arabidopsis thaliana

<400> 28

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ccaaccttaa tcaaatcaga tgagggcatt gatgttttct tacccatatc actcaacctt 120

acggtcctaa ccgatccctt ctccatctct gccgcttctc acgacttcgg taacataacc 180

gacgaaaatc ccggcgccgt cctctgccct tcctccacca cggaggtggc tcgtctcctc 240

cgtttcgcta acggaggatt ctcttacaat aaaggctcaa ccagccccgc gtctactttc 300

aaagtggctg ctcgaggcca aggccactcc ctccgtggcc aagcctctgc acccggaggt 360

gtcgtcgtga acatgacgtg tctcgccatg gcggctaaac cagcggcggt tgttatctcg 420

gcagacggga cttacgctga cgtggctgcc gggacgatgt gggtggatgt tctgaaggcg 480

gcggtggata gaggcgtctc gccggttaca tggacggatt atttgtatct cagcgtcggc 540

gggacgttgt cgaacgctgg aatcggtggt cagacgttta gacacggccc tcagattagt 600

aacgttcatg agcttgacgt tattaccgga aaaggtgaaa tgatgacttg ctctccaaag 660

ttaaaccctg aattgttcta tggagtttta ggaggtttgg gtcaattcgg tattataacg 720

agggccagga ttgcgttgga tcatgcaccc acaagggtga aatggtctcg catactctac 780

agtgacttct cggcttttaa aagagaccaa gagcgtttaa tatcaatgac caatgatctc 840

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gaatatttga tgcactatac aagaaaagaa gattgggtta aacattttgg accaaaatgg 1500

gatgattttt taagaaagaa aattatgttt gatcccaaaa gactattgtc tccaggacaa 1560

gacatattta attaa 1575

<210> 29
<211> 1611
<212> DNA
<213> Arabidopsis thaliana

<400> 29
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accgtccacc cttccgactt agcctccgtc tcctcagact tcggtatgct gaagtcacct 180

gaagagccat tggccgtgct tcatccatca tcggccgaag acgtggcacg actcgtcaga 240

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gattacttgt atctaaccgt tggaggtaca ctctccaatg caggaatcag tggtcaagct 540

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gaggtgatga gatgctcaga agaagagaac acaaggctat tccatggagt tcttggtgga 660

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gtgagatgga tacgggtatt gtattcgagc ttcaaagtgt ttacggagga ccaagagtac 780

ttaatctcaa tgcatggtca attaaagttt gattacgtgg aaggttttgt gattgtggac 840

gaaggactcg tcaacaattg gagatcttct ttcttctctc cacgtaaccc cgtcaagatc 900

tcctctgtta gttccaacgg ctctgttttg tattgccttg agatcaccaa gaactaccac 960

gactccgact ccgaaatcgt tgatcaggaa gttgagattc tgatgaagaa attgaatttc 1020

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gctgagtttg atccgcgaca catactcgct actggtcaga gaatctttca aaacccatct 1560

ttgtctttgt ttcctccgtc gtcgtcttct tcgtcagcgg cttcatggtg a 1611

<210> 30
<211> 1515
<212> DNA
<213> Arabidopsis thaliana

<400> 30
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tttgaacatg tccatcacgc ctccaaagat tttggaaatc gataccagtt gatccctttg 180

gcggtcttac atcccaaatc ggtaagcgac atcgcctcaa cgatacgaca catctggatg 240

atgggcactc attcacagct tacagtggca gcgagaggtc gtggacattc actccaaggc 300

caagctcaaa caagacatgg aattgttata cacatggaat cactccatcc ccagaagctg 360

caggtctaca gtgtggattc ccctgctcca tatgttgatg tgtctggtgg tgagctgtgg 420

ataaacattt tgcatgagac cctcaagtac gggcttgcac caaaatcatg gacggattac 480

ctgcatttaa ctgtaggtgg tactctgtcc aatgctggaa taagcggcca ggcattccga 540

catggaccac agatcagcaa tgttcatcaa ctggagattg tcacaggaaa aggcgagatc 600

ctaaactgta caaagaggca gaacagcgac ttatttaatg gtgttcttgg tggtttaggt 660

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acgacaagag aagagtggag atcccatttc ggggacaagt ggggagaatt tgtgaggagg 1440

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gtctcatact catga 1515

<210> 31
<211> 84
<212> DNA
<213> Arabidopsis thaliana

<400> 31
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tcggcgatga taccagagat cgat 84

<210> 32
<211> 28
<212> PRT
<213> Arabidopsis thaliana

<400> 32
Ser Ala Ser Gly Leu Ala Leu Leu Tyr Pro Thr Asn Arg Asn Lys Trp
1 5 10 15

Asp Asn Arg Met Ser Ala Met Ile Pro Glu Ile Asp
20 25

<210> 33
<211> 2814
<212> DNA
<213> Arabidopsis thaliana

<400> 33

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ggccacttca ccgtccaccc ttccgactta gcctccgtct cctcagactt cggtatgctg 180

aagtcacctg aagagccatt ggccgtgctt catccatcat cggccgaaga cgtggcacga 240

ctcgtcagaa cagcttacgg ttcagccacg gcgtttccgg tctcagcccg aggccacggc 300

cattccataa acggacaagc cgcggcgggg aggaacggtg tggtggttga aatgaaccac 360

ggcgtaaccg ggacgcccaa gccactcgtc cgaccggatg aaatgtatgt ggatgtatgg 420

ggtggagagt tatgggtcga tgtgttgaag aaaacgttgg agcatggctt agcaccaaaa 480

tcatggacgg attacttgta tctaaccgtt ggaggtacac tctccaatgc aggaatcagt 540

ggtcaagctt ttcaccatgg tcctcaaatt agtaacgtcc ttgagctcga cgttgtaact 600

ggttagtatt aaaacattca agttcatata ttttaaatgc ttttgtctga agttttacta 660

ataacaagaa attgatacca aaaagtaggg aaaggagagg tgatgagatg ctcagaagaa 720

gagaacacaa ggctattcca tggagttctt ggtggattag gtcaatttgg gatcatcact 780

cgagcacgaa tctctctcga accagctccc caaagggtaa tatttttta atgactagct 840

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aaccaactct actggaatct taacttatcc ttggttttgg taggctttta tagcaacacg 1680

gtttttttaa ttttcctatt ccagattttg tatattaaat gtcgattttt tttctttttg 1740

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tccaagaatt tatgggaggt tccacaccca tggctcaacc tcttcgtgcc aaaatcaaga 1920

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tacacttgtg gggattaatt agtggtccaa gaaaaaaagt ttgtcaaaat tgaaaaaaac 2160

tagacacgtg gtacatggga ttgtccgaaa aacgttgtcc acatgtgcat cgaaccagct 2220

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